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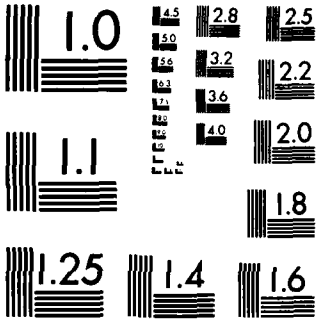


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# PRODUCTIVITY: The View of a Private Human Resources Contractor

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August 1981



Presentation to:

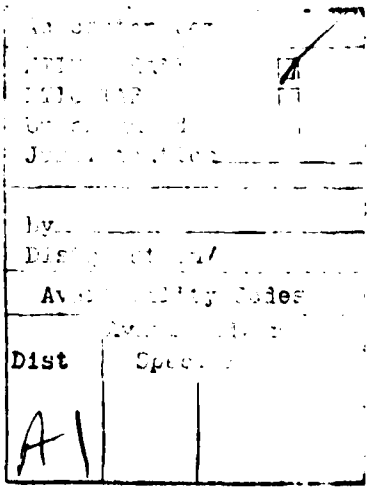
**Seminar on**
**Productivity and the Future of Vocational Education**
**Moorhead State University**
***Moorhead, Minnesota***
**September 1980**

## Prefatory Note

In September 1980, the Joint Council on Vocational Teacher Education and Moorhead State University sponsored a seminar on "Productivity and the Future of Vocational Education." The seminar was held in Moorhead, Minnesota, and was attended by a variety of local, state, and regional personnel concerned with vocational education to accomplish four goals: (1) to increase their understanding of industrial productivity; (2) to increase their ability to assess the short- and long-term staff development needs of vocational teachers; (3) to increase their competence in teaching vocational teachers more effectively and productively; and (4) to increase their acceptance of new and proven training/development strategies utilized in the private-sector industrial training environment.

This paper was presented by Dr. Saul Lavisky, HumRRO's Director for Market and Information Services, to provide seminar attendees with an overview of HumRRO experience that might help them achieve the seminar goals. It is being "packaged" as a HumRRO Professional Paper to make it more widely available to interested audiences.






# PRODUCTIVITY: THE VIEW OF A PRIVATE HUMAN RESOURCES CONTRACTOR

Saul Lavisky

My assignment this morning, as a member of this panel on "Productivity and the Future of Vocational Education," is to try to give you some understanding of the role of the private human resources contractor in the vocational education enterprise. Both as a function of our position as a nonprofit R&D organization, and of our 30 years of emphasizing one particular vocation--the military services--our story is not typical of the entire human resources research community. Nevertheless, I hope that some of what we have learned over the past three decades will be useful to you.

## Department of Defense

The Department of Defense operates the largest "school system" in the Nation, and perhaps in the world. Official statistics only a few years ago indicated that this system was providing 251,400 man-years of training and education at a cost of approximately $6-billion. Some 130,100 military personnel and 61,200 civilians were engaged primarily in support of this training. Since most military courses take less than a full year (some take only a few weeks or months), the number of man-years reflects only the *average* number of students in training during any year. In Fiscal Year 1977, for example, about 1,500,000 military personnel took some form of individual training.

If we disregard the relatively specialized subject-matter of much military training, we can identify a number of parallels between the Department of Defense "school system" and our civilian education system. Military training is, after all, essentially a form of vocational education--the vocations being those of soldier, sailor, airman, and marine.

The productivity of a training system that deals with 1,500,000 students per year is obviously a matter of concern to its managers, who are also concerned with the on-the-job productivity of the system's graduates. Nevertheless, military training managers rarely speak of "productivity" in these two senses, but speak instead of the "cost-effectiveness" of training. Unit commanders do not speak of productivity, but of "combat readiness," which they tend to measure in terms of the ability of soldiers and equipment to do what they are supposed to do.

Applying the concept of "productivity" to the educational enterprise also presents me with some difficulty. Although it is a perfectly respectable term in the economic realm, it seems less applicable to the field of education. *Quantity* is generally easier to measure than *quality*, and most definitions of productivity focus on the former, not the latter. But I wonder if the teacher

who does a mediocre job with 50 students is *really* more productive than the one who does a good job with 25?

The military tends to measure productivity in different ways under different conditions. When the nation is at war and soldiers must be gotten to the front lines quickly, "time saved" in training is the important metric, and the cost of training is relatively less important. But when the nation is at peace, and military dollars are scarce, a reversal in priorities occurs, and "dollars saved" becomes relatively more important than course length. But it is *always* important that soldiers be trained *effectively* (that is, up to some minimally acceptable standard). Increasing the number of students who reach that standard, and reducing the number who have to be recycled or attrited, increases the productivity of the training system.

Some specific illustrative examples follow. The first case is one in which HumRRO provided curriculum-development support to the Army in a single subject-matter area, and the second is a curriculum-development effort related to an entire program of instruction.

## TRAINFIRE

The single skill that is common to all soldiers, irrespective of particular military occupational specialty, is rifle marksmanship. With very few exceptions, every new soldier must learn to use this basic Army weapon. For 15 years, from early World War II to mid-1957, the standard Army rifle marksmanship training program was a 90-hour course involving five sequential phases of instruction: sighting-and-aiming; firing positions; trigger squeeze; sustained fire; and sight-setting. This program required trainees to fire 377 rounds of ammunition at bull's-eye targets on known-distance ranges.

In May 1957, the Army began implementing a new marksmanship program developed by HumRRO. This new program, called TRAINFIRE, was designed to provide marksmanship training more carefully and directly oriented toward combat requirements than the "standard" course was. It required only 343 rounds of ammunition and was built around use of a realistic, remotely-controlled pop-up target that could be "killed" if struck. Concurrent training with live "targets" in the field was also conducted. This new program, which incorporated a number of well-established principles of learning, was so effective that the Army adopted it after a large-scale series of field trials.

The TRAINFIRE program involved HumRRO in a five-step developmental attack on the problem.

1. Our researchers analyzed the battlefield situation a rifleman encounters and identified the essential marksmanship skills. They analyzed battle reports and other written accounts of combat operations, and interviewed literally hundreds of combat veterans. The information thus collected yielded a number of premises which were validated by Infantry School experts and became the basis for the rest of the project:

   a. Combat riflemen's targets are enemy personnel who are rarely visible, except in close combat.

   b. They rarely see or fire upon enemy personnel who are more than 300 yards away; when they do, they locate them by fleeting indicators, such as

smoke, flash, dust, noise, or movement.

c. They rarely use their rifle slings to steady their aim, but will try to support their rifles in *some* manner, if support is available.

d. The sight picture used in combat differs from that used in firing on bull's-eye targets. Riflemen rarely adjust rifle sights to take account of windage.

e. Effectiveness as a rifleman depends on ability to hit individual enemy targets rather than simply to inundate an enemy-occupied area with unaimed or poorly aimed rifle fire.

2. Our researchers next developed proficiency tests to measure individual mastery of the critical rifleman sk lls. They found two types of skills to be essential: (1) target detection; and (2) simple marksmanship. To assess both types of ability, the TRAINFIRE team constructed two types of proficiency-measurement ranges. These ranges approximated, as closely as measurement and safety conditions would allow, the situation a rifleman encounters in a daylight fire-fight with the enemy.

3. The third step in the project was to develop a training method that would integrate all essential skills into a coordinated course of instruction, taking into account such well-established training principles as motivation, knowledge of results, meaningful units of instruction, repetition, distributed practice, and variety in training materials.

As part of the developmental effort, we devised a "killable" target, nicknamed "Punchy Pete." Under remote control, this target would suddenly pop up from some type of concealment and remain exposed for a brief period. When fired upon and hit, the target would fall, thereby providing immediate knowledge of results to enhance trainee motivation. It also taught trainees to fire again if the first shot missed and the target was still visible--just as they would be expected to do in combat.

The new program not only provided greater realism than the conventional course, but also provided better grounding in such fundamentals as proper battlefield sight picture, sight alignment, and trigger control. It also provided concurrent training in both detection and marksmanship skills, culminating in proficiency tests of both these skills.

The final segment of the program was the Record Course, a proficiency test that measured how well trainees had learned both the fundamentals and finer points of target detection, marksmanship, and field firing. Trainees would go to an unfamiliar range, fire the TRAINFIRE course, and be scored on the basis of their hits and misses.

4. In the fourth phase of the project, the Army provided a full company of basic trainees for experimental evaluation of the new rifle marksmanship program. The company was divided into two comparable groups. One group received the new program during its eight weeks of basic training; the second (control) group received the standard instruction. When time came for formal evaluation, the Army provided another group of soldiers, trained at a different Army post, to constitute a second control group.

5. In the final phase of the TRAINFIRE project, all three groups fired the Record Course. The experimental group scored the most hits on targets--in fact, *significantly* more hits than either control group.

On the basis of these experimental results, the Army directed that a Troop Test be conducted to determine if TRAINFIRE's superiority would "hold up" when training was conducted in a number of different locations. The Troop Test, conducted in 1955, involved more than 10,000 soldiers at Fort Jackson, S.C., Fort Benning, Ga., and Fort Carson, Colo. Results confirmed the experimental findings. *In every instance*, the average record firing score for trainees in test companies was higher than the average score for trainees in control companies. In fact, the company average for the *best* control companies was below the average for the *poorest* test company.

The Army looked at the results and found that the new program better prepared soldiers to detect and hit targets. So much for *effectiveness*. But the new program also took less training time and cost less in overhead and maintenance than the conventional course. So, in sum, it met all three of the Army's criteria for increased productivity.

But, even though the new program was demonstrably superior to the old one in preparing soldiers for the battlefield, it was not adopted without reservation. In the 1950s, the Army competed every year with the other Services in a rifle marksmanship competition at Camp Perry. This competition was fired on a conventional known-distance range with bull's-eye targets, a situation which the TRAINFIRE program ignored completely. A number of fairly senior officers were concerned that the Army would suffer a setback in this competition if it adopted a marksmanship program centered around battlefield--rather than rifle-range--conditions.

Although this was (or should have been) an irrelevant consideration, it was, nonetheless, a *real* one. Two other irrelevant, outside factors favored adoption, however. Liaison officers from both the Israeli and Canadian armies were at Fort Benning, Ga., while HumRRO was conducting its TRAINFIRE project. They took full descriptions of the program, the tests, and the results home and, while the U.S. Army was still "staffing" its decision, the Israeli and Canadian armies adopted the TRAINFIRE program. A short time later, the U.S. Army adopted TRAINFIRE as its Basic Rifle Marksmanship program.

## SHOCKACTION

The research-based TRAINFIRE program produced significant improvements (increased productivity, if you will) in a single "subject-matter" area. But Project SHOCKACTION produced a complete program of instruction for armor tank crewmen.

This project began in 1954 with a request from the Army's training headquarters for research to improve the Armor Advanced Individual Training (AIT) program. This headquarters complained that armor trainees, at the end of AIT, lacked the proficiency to perform satisfactorily on the job, and requested research to produce new instructional methods and techniques for training that would improve the performance of tank gunners, drivers, and loaders.

This project was undertaken in six phases. First, we determined what each tank crew member needed to know to perform with maximum proficiency. We developed lists of job requirements from a review of doctrinal literature, and from interviews and observation. Again, experienced Army officers evaluated our lists of jobs and tasks and shaped them into criterion lists of the duties, activities, and responsibilities of tank crew members.

Next, we developed two tests of armor knowledge to test crewmen (1) at the end of the AIT period, and (2) on the job. Preliminary versions of these tests were administered to both trainees and experienced tankers. The results were analyzed and the tests were revised until their validity and reliability were established.

In the third phase of Project SHOCKACTION, we administered these tests to more than 6,000 tank crewmen throughout the Army to determine how knowledge of important armor duties varies with training and experience. Trainees with no armor experience, recent AIT graduates, and tank crewmen in units throughout the United States were tested. Results confirmed the assessment which had generated the study. Overall proficiency was *not* satisfactory, and improvement in the Armor Advanced Individual Training program *was* needed.

Army doctrine directs that all tank crew members be cross-trained; that is, a man must be able to perform the duties of every other crew member. In the fourth phase of SHOCKACTION, the effectiveness of this cross-training was assessed to determine the actual "interchangeability" of tank crew members. We administered a proficiency test to 100 tank crewmen at each crew position and found that they did *not* know the other jobs as well as the ones to which they were assigned, and that experience and aptitude were clearly related to both proficiency and assigned crew position.

The fifth phase of the research involved intensive examination of the then-current Armor AIT program to identify any obvious ways in which it could be improved. We conducted experiments to determine how learning was affected by increasing and decreasing time devoted to particular subject-matters. We developed proficiency tests for ten of the most important subjects and skills in the standard AIT program, and administered them to typical groups of trainees immediately after they had completed instruction. We also constructed learning curves for each unit by allowing the trainees to practice their new skills until each curve reached a stable level.

In the sixth phase, we used the information collected in the first five phases to design and construct an improved AIT program. By including "need to know" material only, and eliminating "nice to know" subject matter, we built a new program that took only six weeks of training, rather than the eight weeks required by the conventional course.

This new program minimized all training not directly related to the essential armor skills. It included special administrative procedures to insure maximum use of available instructional time. It incorporated a number of well-known principles of instruction:

1. Adhering to training objectives;
2. Interrelating tasks with each other and with the whole program;

3. Emphasizing learning by doing;
4. Communicating the materials adequately;
5. Giving immediate knowledge of results;
6. Encouraging motivation; and
7. Attempting to approach the realism of the actual "job" situation.

The detailed job descriptions prepared for the crew positions were used to establish what should be taught in the training program. The criterion for reducing or eliminating subject matter was always its relevance to tank crew member functions. Special job aids were developed: photographic charts of the steps in each crew member's job were put into book form, and each trainee received his own copy. Small-group instruction was stressed, and instructor lesson plans were heavily detailed, in many cases to the point of including complete scripts.

Finally, we administered the six-week experimental course to a company of armor trainees. At the end of the course, we administered a proficiency test simultaneously to this company and to a comparable one (a control group) that had just completed the standard eight-week course. Members of the control company scored higher on 3 of 21 subtests. The two companies scored comparably on seven others. But graduates of the experimental course scored significantly higher than their conventionally-trained peers on 11 subtests and, more importantly, on the ones covering the more complex armor skills. In sum, then, the research-based training program not only saved time and money (by reducing the course length 25-percent), but also produced more capable graduates than the then-standard course.

HumRRO and the Army's training headquarters recommended adoption of the new program "as is." However, at that time, a Federal law required a new soldier to receive at least 16 weeks of individual training before being sent overseas as a replacement. The six-week HumRRO-developed program and the eight-week basic training phase, together, took only 14 weeks, so the recommendation had to be turned down by Army headquarters. So, with the technical assistance of the SHOCKACTION research team, the Armor Training Center added two more weeks of instruction and practice to the research-based program. Shortly thereafter, the Army began to implement this *adaptation* of the SHOCKACTION training program.

## Curriculum Engineering

The two aforedescribed projects were similar in approach. HumRRO's early work for the Army involved curriculum-development projects for individual military occupational specialties. We called these "individual Curriculum Engineering (ICE) projects." But the Army had almost 400 separate specialties in the 1950s, and it was obvious that an organization our size could not perform such concentrated and detailed work to help improve each of them. We investigated the ways in which we had handled the early ICE projects, recognized essential similarities and, in 1961, proposed a standardized approach that both professionals and nonprofessionals could use to develop new curricula or to improve existing ones. We formalized the approach in a model which we called "the systems engineering approach to curriculum development." Today, this concept is

# Principal Activities in the Development of an Instructional System

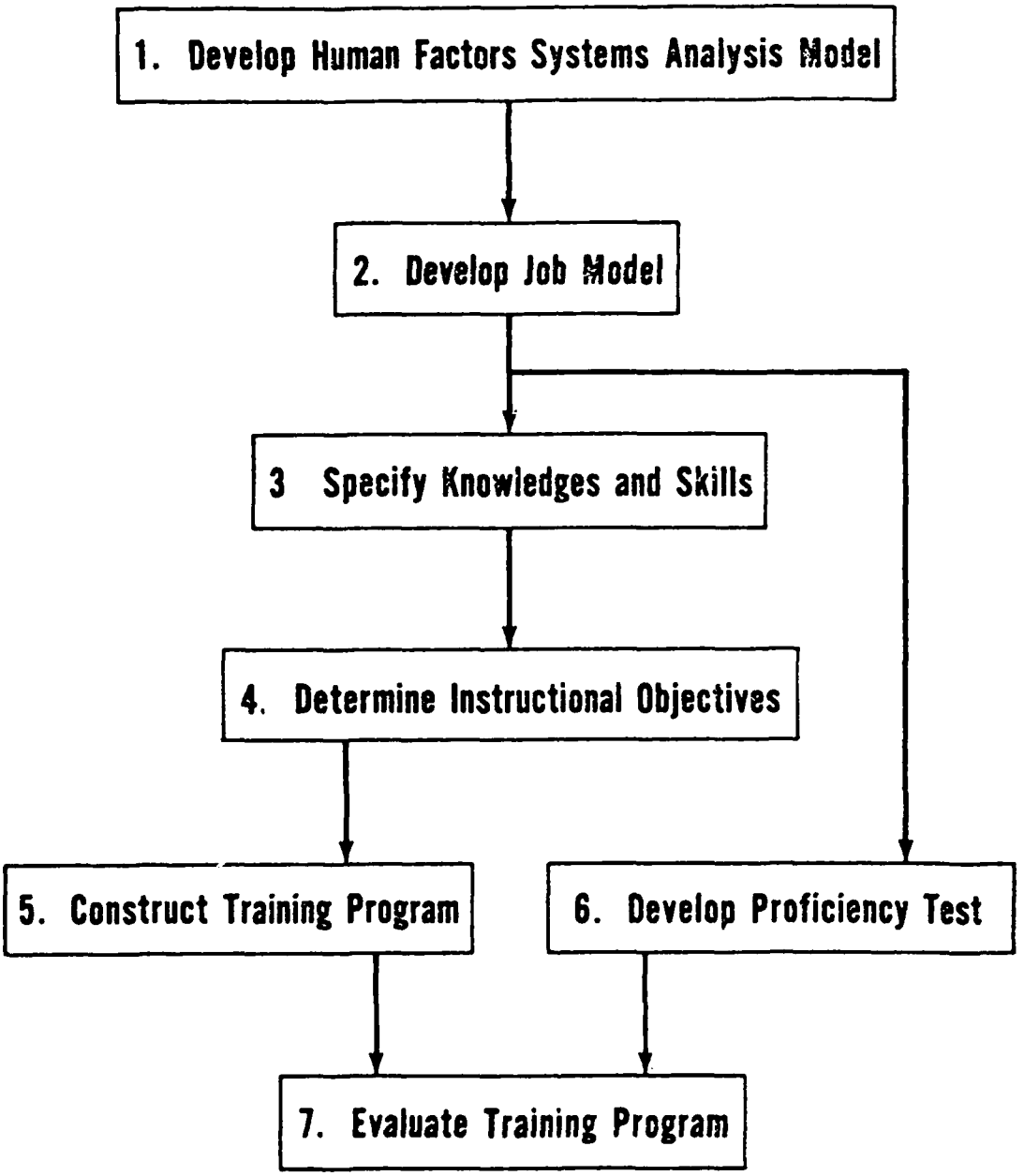



FIGURE 1

known by a number of other names as well; the Systems Approach to Training (SAT) and Instructional Systems Design (ISD) are two of the most popular labels.

The seven-step schema proposed by HumRRO (Figure 1) has been found to shorten training time, lower costs, and improve the on-the-job proficiency of graduates. In Step 1, an analysis is made of the job setting--the functions of all the people and equipment that operate together to produce the intended end-result or product of the "system." The system may consist only of one individual and his equipment, or it may include a complex of interacting people and machinery. The Step-1 analysis reveals the essential features of each human and hardware component, and may lead to system redesign.

In Step 2, a job model is developed to identify the inputs to job incumbents from the rest of the system and the outputs they must return to the system.

At this point, the develop process follows two parallel courses which come together in the last step. The right-hand path in the figure leads to Step 6, in which a proficiency test is developed from the job model. The testing situation presents realistic inputs to the student who then performs in an actual or simulated job environment to produce a required output. Minimum standards of performance are set to correspond to system requirements. In setting these standards, training developers work with, and seek the judgments of, experienced supervisors--the system managers. These performance standards become the *terminal objectives* of the training program, constituting design objectives for Steps 3, 4, and 5.

Step 3 involves determining what knowledges and skills trainees require to respond to the inputs they get from their job environments and to produce the outputs specified by the job model. These are internal processes, such as sensing, perceiving, consulting the store of knowledge in their memories, and using output skills of manipulating tools, writing, and communicating with others.

The next step--the determination of instructional objectives--is critical. Terminal objectives were identified in the course of building the proficiency test (in Step 6). But in Step 4, *enabling* objectives are set. Their attainment provides the student with the required knowledges and skills. If the student's entry knowledges and skills are carefully inventoried and subtracted from the requirements, individually tailored curricula can be prescribed. Parenthetically, note that the basis for selecting students may be derived in this step--if one has the freedom to be selective.

Step 5, curriculum building, involves choosing particular subject-matter, programming it in suitable sequences, selecting efficient media for presentation, and providing opportunities for trainees to practice and instructors/managers to measure attainment of the enabling objectives. For job-oriented training, a "functional context" method has proven to be an efficient method of sequencing. This method dictates that information and practice be presented in a job-like sequence and context. It emphasizes job relevance and sustains student motivation.

In Step 5, we also select or design training devices and simulators to provide practice in necessary and difficult skills. At this point in the process, we also prepare job aids which the student can take with him on the job to carry necessary detailed knowledge that does not have to be committed to memory. During this step, specific instructional modules are tested and fitted together into large sequences.

Step 7 is the evaluation process. The proficiency test, with specified minimum levels of achievement, is the measuring instrument. A typical group of students who have worked through the curriculum developed in Step 5 are measured against performance specifications derived from the job. The success of the curriculum is measured by the number of students who meet minimum performance standards. A symmetrical distribution of scores--the traditional bell-shaped "normal" curve--is irrelevant. If the proportion of students who meet performance standards is insufficient, it is "back to the drawing board" for a rework of the curriculum.

This seven-step schema can obviously be applied to specific jobs in easily identified systems. It becomes increasingly difficult to apply as the range of job requirements in an occupation expands. Nevertheless, the paradigm as a whole, with conscious attention to each step, has proven extremely useful as a guide for building training for a great variety of jobs, and as useful in the civilian arena as in the military environment for which it was developed. In fact, it seems to provide a useful set of specific criteria for measuring the relevance of *any* educational or training program.

This paradigm is by no means an exclusive HumRRO invention. Systems analysis and job analysis were practiced during World War II, and were polished to some degree by scientists in the Army Air Forces Aviation Psychology Program. In the 1930s, Dr. Ralph Tyler at the University of Chicago had proposed that behaviorally-stated instructional objectives be derived and specified in the curriculum-development process. Not one of the seven steps was *invented* by HumRRO. In the 1950s and 1960s, however, none of the military Services was developing its curricula in such a systematic, orderly fashion, and the approach represented an *innovation* if not an invention.

Despite the demonstrated benefits to be obtained by following this particular systems approach to curriculum development, it did not become official Army training doctrine for another six years. In 1968, we persuaded the Army to convene a committee of educational advisors from its 26 Service Schools to examine the "systems approach," and to consider how it might be adopted to improve training, Army-wide. HumRRO provided technical assistance to the committee which, in late 1968, prepared an Army regulation directing that, thereafter, all new curricula developed by the Army would follow this HumRRO-developed model. At the same time, HumRRO was providing technical assistance to the U.S. Air Force, which published a highly detailed manual suggesting--but not directing--that a systems approach to curriculum development be used in that Service.

In 1973, a slightly different version of the model, incorporating features from both the Army and the Air Force, was produced for the U.S. Department of Defense by Florida State University. This is the so-called Instructional Systems Development (ISD) model, which is now used to some extent by all the Armed Services. The ISD model uses five major steps, where the HumRRO model used seven, but each of those five steps is fleshed out by a number

of substeps. (Incidentally, a 1979 study by HumRRO for the Department of Defense found that *none* of the Services was using the ISD approach as well as it might, and the enormous potential of this approach for insuring that training meets job requirements is not presently being fully realized.)

## Implementation

The three foregoing illustrations from HumRRO's work for the Army and its training system indicate the perspective of a private human resources contractor on vocational education and productivity. In each example, there was a lag between the time we made a recommendation and the time the Army adopted and implemented it. There were also times when the Army completely ignored one of our recommendations or R&D products and simply filed our reports and prototypes away in its information-retrieval system. Some research we undertook a dozen years ago produced a list of the characteristics of successully implemented research results. There is no particular importance in the order in which I cite them.

1. Timeliness. The research product filled a recognized instructional gap; it was relevant to a planned or ongoing revision.

2. Command Interest. Some operational command had a strong interest in the research results. To put it another way, there was interest both at top management and at the working level.

3. Product Engineering. The end-product of our research was a "plug-in" item, specifically engineered for a given situation, and requiring little additional Army effort to adapt to the operational setting, and no doctrinal changes.

4. Concreteness. The research produced a material item, such as complete lesson plans or a training device with a user's handbook. It was *something*, not just information packaged in a technical report.

5. Zeitgeist. Some other Service, or foreign army, or civilian institution had accepted the product, or something like it. It was not excessively novel. It was in step with the times.

6. Personal Interest. Some officer or group of officers associated with HumRRO became convinced of the worth of the product or recommendation and were willing to serve as forceful and dogged proponents; or someone in a high position in the Army *liked* the recommendation because it conformed to his own views and directed that it be implemented.

Where efforts to get a product or a recommendation implemented were unsuccessful, we found that one or more of the following characteristics obtained.

1. Poor Communication. Neither our presentations or our reports effectively conveyed the validity and operational value of our research results.

2. Lack of Timeliness. Our research results did not meet a valid contemporary requirement. It was too late, too early, or too tangential to then-current interests.

3. Too Drastic. Too many changes in operating procedures would be required; training would be shortened or lengthened too much.

4. Lack of Strong Command Support. Some highly placed individual did not like our product or recommendation.

5. Cost. Funds and personnel required to implement and operate the new procedure had not been programmed and could not be obtained.

6. Lack of Engineering Capability. The Army experts required to translate the research findings into operational terms and content did not exist or were not available where and when needed.

7. Policy Problem. Doctrine under which to fit the new or improved training or operational capability was lacking.

8. Insufficient "Salesmanship." HumRRO did not devote enough additional time or effort to "selling" the product, believing that this was not the job of the research agency.

9. Sacred Cow. The product or recommendation was perceived to attack current practices, individual competence, sacred cows, tradition, or long-accepted doctrine.

There was one other possible factor in the nonacceptance of a HumRRO recommendation, and that is that the recommendation was not as good or as important as we in HumRRO thought it was. No matter how much we try to learn about the client's system and situation, and no matter how scholarly and professional sound a job we do, we are still *outside* the client's system and situation. The responsibility for making changes rests with the clients, because they will have to suffer the consequences of any mistakes, and will have to pay the bills even if the hoped-for and predicted improvements in productivity do not materialize.

HumRRO has certainly not been the sole--or even the most important--force in leading the Army to its present advanced stage in the training development field. But the improvements of the past 30 years have been made in directions to which HumRRO has pointed.

The system the Army now has in place includes:

o An Army Research Institute for the Behavioral and Social Sciences (ARI) which seeks out job-performance problems that improved training might solve. This Institute conducts and contracts for research and development of the type HumRRO has done these past 30 years.

o A Training Developments Institute (TDI) at the Army's training headquarters which molds the results of ARI (and other) research into forms that can be readily implemented by the Army's training centers, schools, and operational units.

o A Training Support Center (ATSC) which "manufactures," stocks, and disseminates "transportable" materials developed by ARI and TDI, making them available Armywide.

## Basic Skills Education

The Armed Services have to provide skills training for hundreds of thousands of adults annually, some of whom are slow to learn and who perform poorly on various aptitude and classification tests and on tests of academic skills and knowledges--reading, writing, and arithmetic. The wide range of cognitive capabilities that characterize enlisted training populations complicates the task of training.

The highly related issues of literacy, minimum competency, and functional ability in basic skills have reached peak importance in both military and civilian life. From the initiation of Project 100,000 in the late 1960s, the Armed Services--as a matter of social policy--have invited upon themselves the problem of training enlistees who were previously ineligible for service due to low aptitude scores and the like. You are all painfully familiar with reports not only of adult illiteracy, or illiteracy among the disadvantaged, but even of functional illiteracy among high-school graduates (and even among some college graduates).

In August 1977, the Congress directed the Secretary of Health, Education, and Welfare, and the Secretary of Labor, in coordination with the Secretary of Defense, to establish a preenlistment Basic Skills Education Program (BSEP) by Fiscal Year 1979.

The Army had been concerned with literacy training for some of its soldiers since World War II. Between 1943 and the end of that war, some 300,000 men had received literacy training in the Army, and 250,000 of them were graduated after they had, presumably, reached a 5th grade reading level. Some reading experts cite the Army's program as an example of an approach for upgrading the literacy skills of adults to render them better, more competent, job performers. However, evaluation of the effects of such literacy training on job proficiency had been almost nonexistent.

During the 1950s, the Army had additional opportunities to conduct literacy training (during the Korean War), and to evaluate the effect this training had on job proficiency. It was forced to conclude that little benefit to job proficiency had been demonstrated to result from the provision of *general training* in basic literacy skills.

Nevertheless, in 1966, when Secretary of Defense McNamara instituted Project 100,000, the Army reinstituted general literacy training programs to upgrade the literacy skills of "marginal personnel" to the 5th grade reading level.

HumRRO research on literacy training began in the 1950s. We found extremely slight improvement in the performance of men who received literacy training when we tested them at the conclusion of basic training. We did not follow them for further testing on the job.

In 1971, we evaluated the effectiveness of the Army's literacy training program for the marginal men who had been admitted under Project 100,000. We studied the records of some 9,000 such men and found that, while graduates of the training program were slightly more likely to achieve a higher pay grade, successful and nonsuccessful trainees did not differ on most indices of military status and performance.

We initiated a program--a series of research projects--to: (1) study and develop methodologies for determining the *functional* literacy levels of jobs; (2) determine *functional* literacy levels for major military occupational specialties into which large numbers of marginally literate men are apt to be assigned; and (3) develop a prototype literacy training program designed to provide a level of *functional* literacy appropriate to present minimal MOS reading requirements.

As an aside, I would like to point out that the HumRRO-developed literacy training program was selected by the U.S. Office of Education's Right-to-Read Office as one of the 12 outstanding such programs in the nation.

What the Congress told the Army in 1977 was that it could no longer provide on-duty, high-school completion programs, but that it could provide basic skills training that was related to the soldiers' military occupational specialties. This meant that, while the Army could no longer offer *general* literacy training during normal duty hours, it *could* offer a Basic Skills Education Program that was job-related. Congress left to the Army the methods and means to be used in developing and conducting such a program.

The BSEP program that the Army introduced without research and development assistance consists of a wide variety of delivery systems and a wide variety of materials and procedures of uncertain effectiveness. Some BSEP programs offer some MOS-related content and others do not; but no uniform, systematically developed, MOS-related BSEP simultaneously provides long-term development of basic skills for soldiers and the knowledge and skills required by particular military specialties.

The Army has decided to launch a 5-year program to address the basic skill prerequisites for MOS training. To conventional instruction, the *new* BSEP program will add learning strategies, military life-coping skills, and--for some soldiers--"English-as-a-Second-Language."

HumRRO is hoping to take part in developing that program. The phase in which we are most interested, and for which we have submitted a proposal to the Army, is undoubtedly the keystone to the entire effort. The contract will call for development of a number of job-generic products. While some of the contracts the Army will award under the BSEP umbrella will address specific Army jobs, *this* contract will be concerned with basic-skill competencies generic to the Army's 100 highest-density (heaviest populated) jobs. The organization which wins this contract will be asked to examine or to develop task lists for 100 Army jobs, and to derive lists of the basic skills a soldier needs to be able to learn and to perform those tasks.

I want to reemphasize the point that I have deliberately chosen to speak today about HumRRO's work *for the Army only*. Since 1967, we have also conducted research, development, and consultation for civilian organizations--not only the Federal Government, but also such companies as the Ford and Chrysler Motor Companies, Xerox, AT&T, IBM, Wang, FMC Corporation, B.F. Goodrich, and many others. In some few cases, we undertook projects for them which took us through the entire seven steps of the curriculum-development paradigm I have displayed for you. In other cases, we were called in to tackle only one or two of the steps.

But we have had enough experience in the civilian arena over the last 13 years to know that the processes and procedures--the *approach* we have taken in our work for the Army over the past 30 years--works to improve productivity--no matter *how* you define it.

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